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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,656	11/20/2006	Tomoyuki Shinoda	0599-0214PUS1	5671
2292 7590 02/16/2011 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
PATEL, RONAK C				
ART UNIT		PAPER NUMBER		
1788				
NOTIFICATION DATE		DELIVERY MODE		
02/16/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/573,656

Applicant(s)

SHINODA ET AL.

Examiner

RONAK PATEL

Art Unit

1788

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-16 and 32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-16 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/21/2010 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 12, 13, 16 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimori et al. (US 6670006) in view of Kumagai et al. (US 2003/0088108) and Tominaga et al. (US 4444818).

4. Regarding claims 12, 13, 16 and 32 Sugimori discloses an epoxy resin composition for FRP and a prepreg that is an intermediate material made up of an epoxy resin composition (which acts as the matrix resin) combined with reinforcing fibers (abstract). Epoxy resins which act as the matrix resin after curing are excellent in mechanical, electrical and adhesive properties and widely used in the field of electronic

materials, coating materials (col. 1, lines 2—24), which makes it an adhesive composition. The epoxy resin composition comprises epoxy resins i.e. thermosetting resin, and a curing agent (abstract) wherein the curing agent of the epoxy resin composition can be include imidazole compounds etc (col. 5, lines 24-29). Sugimori discloses that the epoxy resin composition for FRP comprises component A, component B, component C, component D (col. 2, lines 40-43), where component D is thermoplastic resin in order to improve the handleability of prepreg can be improved (col. 5, lines 35-43). Sugimori discloses a subject matter prepreg comprising a sheet of reinforcing fibers impregnated with epoxy resin composition (matrix resin) (col. 2, lines 46-50). Sugimori also discloses the reinforcing fibers is made of carbon fibers, glass fibers, aramid fibers, boron fibers, steel fibers singly or in combination wherein carbon fibers are preferred since the mechanical properties after molding are good (col. 7, lines 18-23).

5. However, Sugimori fails to disclose that the adhesive composition comprises imidazole silane compound and thermoplastic resin as claimed.

6. Whereas, Kumagai discloses an imidazole/organic monocarboxylic acid salt is prepared by reacting an imidazole compound represented by general formula (I) with a silane compound having a glycidoxy group represented by formula (2) reacts to form an imidazole silane compound such as formula (II) of the claim 32 of the present invention. (para 0019). Kumagai also discloses that the imidazole/organic reactive product is added to a resin such as epoxy resin to promote the adhesive strength and the mechanical strength of the resin are improved (para 0007). The motivation for including

an imidazole silane compound such as formula II of claim 32 along with the epoxy resin is to improve the adhesive and mechanical strength (para 0007).

7. Whereas, Tominaga discloses a thermosetting adhesive sheet comprising a thermosetting resin sheet shaped prepeg with a reinforcing material (abstract).

Tominaga discloses that the in order to form thermosetting resin composition layers, epoxy resins are preferred and various additives can be added in the thermosetting resin composition (col. 4, lines 10-15) and additives includes thermoplastic resin such as polyamide (col. 4, lines 56-58). The motivation for including a thermoplastic resin such as polyamide along with the epoxy resin is to improve moldability (col. 4, line 56).

8. In light of the motivation of including an imidazole silane compound and including thermoplastic resin such as polyamide with the epoxy resin composition as taught by Kumagai and Tominaga as described above, it therefore would have been obvious to one of ordinary skill in the art at the time of invention to include an imidazole silane compound of Kumagai and thermoplastic resin such as polyamide in the adhesive composition of Sugimori motivated by the desire to improve the adhesive and mechanical strength of the composition and improve moldability characteristics.

9. Claims 12-16 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Friedrich et al. (US 5340946) in view of Sugimori et al. (US 6670006), Kumagai et al. (US 2003/0088108) and Tominaga et al. (US 4444818).

10. Regarding claim 12-16, Friedrich discloses an adhesive composition comprising at least one film forming polymeric resin such as epoxies i.e. thermosetting resin and a curing agent (abstract). Friedrich discloses in example 5 in column 18, where the

adhesive layer is laminated on the surface of a substrate which comprises a piece of fiberglass reinforced epoxy laminate and a piece of epoxy prepreg was placed on the fiberglass reinforced epoxy laminate and epoxy resin of the prepreg was cured. The surface of the cured prepreg was then brushed in order to roughen the surface prior to the application of the adhesive layer.

11. However, Friedrich fails to disclose that the reinforcing fibers are impregnated with the adhesive resin composition such as matrix resin, the reinforcing fibers are carbon fibers, the adhesive resin composition comprises an imidazole compound and thermoplastic resin as claimed.

12. However, Sugimori discloses an epoxy resin composition for FRP and a prepreg that is an intermediate material made up of an epoxy resin composition (which acts as the matrix resin) combined with reinforcing fibers (abstract). Epoxy resins which acts as the matrix resin after curing are excellent in mechanical, electrical and adhesive properties and widely used in the field of electronic materials, coating materials (col. 1, lines 2—24), which makes it an adhesive composition. The epoxy resin composition comprises epoxy resins i.e. thermosetting resin, and a curing agent (abstract) wherein the curing agent of the epoxy resin composition can be include imidazole compounds etc (col. 5, lines 24-29). Sugimori discloses that the epoxy resin composition for FRP comprises component A, component B, component C, component D (col. 2, lines 40-43), where component D is thermoplastic resin in order to improve the handleability of prepreg can be improved (col. 5, lines 35-43). Sugimori discloses a subject matter prepreg comprising a sheet of reinforcing fibers impregnated with epoxy resin

composition (matrix resin) (col. 2, lines 46-50). Sugimori also discloses the reinforcing fibers is made of carbon fibers, glass fibers, aramid fibers, boron fibers, steel fibers singly or in combination wherein carbon fibers are preferred since the mechanical properties after molding are good (col. 7, lines 18-23). The motivation for impregnating reinforcing fibers with the adhesive composition such as matrix resin and using the curing agent as imidazole compound is to form a prepreg that has suitable tack and flexibility and is good in balance between stability with time and curability and also the crushing and the flexural strength in a direction of 90 degree are improved (col. 7, lines 50-58) and the motivation for using the carbon fibers in the prepreg is to have good mechanical properties after molding (col. 7, lines 18-23).

13. Whereas, Kumagai discloses an imidazole/organic monocarboxylic acid salt is prepared by reacting an imidazole compound represented by general formula (I) with a silane compound having a glycidoxy group represented by formula (2) reacts to form an imidazole silane compound such as formula (II) of the claim 32 of the present invention. (para 0019). Kumagai also discloses that the imidazole/organic reactive product is added to a resin such as epoxy resin to promote the adhesive strength and the mechanical strength of the resin are improved (para 0007). The motivation for including an imidazole silane compound such as formula II of claim 32 along with the epoxy resin is to improve the adhesive and mechanical strength (para 0007). Further, the data is not persuasive given that Kumagai already recognizes the criticality of using imidazole silane, namely, that using such imidazole silane would improve adhesion which is the same motivation as disclosed in the present invention.

14. Whereas, Tominaga discloses a thermosetting adhesive sheet comprising a thermosetting resin sheet shaped prepeg with a reinforcing material (abstract).

Tominaga discloses that the in order to form thermosetting resin composition layers, epoxy resins are preferred and various additives can be added in the thermosetting resin composition (col. 4, lines 10-15) and additives includes thermoplastic resin such as polyamide (col. 4, lines 56-58). The motivation for including a thermoplastic resin such as polyamide along with the epoxy resin is to improve moldability (col. 4, line 56).

15. In light of the motivation of impregnating reinforcing fibers with the matrix resin and using the curing agent as imidazole compound and using the carbon fibers in the prepeg and including an imidazole compound and thermoplastic resin such as polyamide as taught by Sugimori, Kumagai and Tominaga as described above, it therefore would have been obvious to one of ordinary skill in the art at the time of invention to use adhesive composition with epoxy and imidazole compound wherein carbon fibers are impregnate the reinforcing fibers of Friedrich with the reinforcing carbon fibers with an imidazole with the adhesive composition as taught by Sugimori to form a prepeg that has suitable tack and flexibility and is good in balance between stability with time and curability and also the crushing and the flexural strength in a direction of 90 degree are improved to have good mechanical properties after molding (col. 7, lines 18-23) and it therefore would have been obvious to one of ordinary skill in the art at the time of invention to include an imidazole silane compound of Kumagai in the adhesive composition of Friedrich motivated by the desire to improve the adhesive and mechanical strength of the composition and thermoplastic resin such as polyamide

in the adhesive composition of Friedrich motivated by the desire to improve moldability characteristics.

Response to Arguments

16. Applicant's arguments filed 10/22/2010 have been fully considered but they are not persuasive. Applicant argues that Kumagai fails to recognize the advantageously improved adhesive properties exhibited when imidazole silane compounds are used, with respect to titanium or titanium alloys and there is no motivation to use imidazole silane compounds in Sugimori or Friedrich. However, it would be obvious that the prepeg comprising the adhesive resin composition and reinforcing material taught by Sugimori et al. (US 6670006) in view of Kumagai et al. (US 2003/0088108) and Tominaga et al. (US 4444818) would intrinsically show improved adhesive properties exhibited when imidazole silane compounds are used, especially would respect to titanium or titanium alloys. Kumagai also shows improved adhesive properties when imidazole silane compounds are used in para 0007.

17. Applicant argues that examples 9, 13 and 15 shows improved results over examples 1-4 and using imidazole compounds increases the adhesive properties. However, the data is not in commensurate in scope with the scope of the claims, as examples 9, 13 and 15 discloses the use of specific thermoplastic resin such as polyamide, whereas claim 12 is directed to use additional thermoplastic resins in the prepeg. Similar issues arise with respect to the thermosetting resin. However, even if the data were persuasive, the rejections would be maintained as Kumagai already recognizes the criticality of using imidazole silane, namely, that using such imidazole

silane would improve adhesion which is the same motivation as disclosed in the present invention.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RONAK PATEL whose telephone number is (571)270-1142. The examiner can normally be reached on Monday to Thursday 8 AM EST to 6PM EST.

19. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. P./

Examiner, Art Unit 1788

02/08/2011

/Callie E. Shosho/

Supervisory Patent Examiner, Art Unit 1787